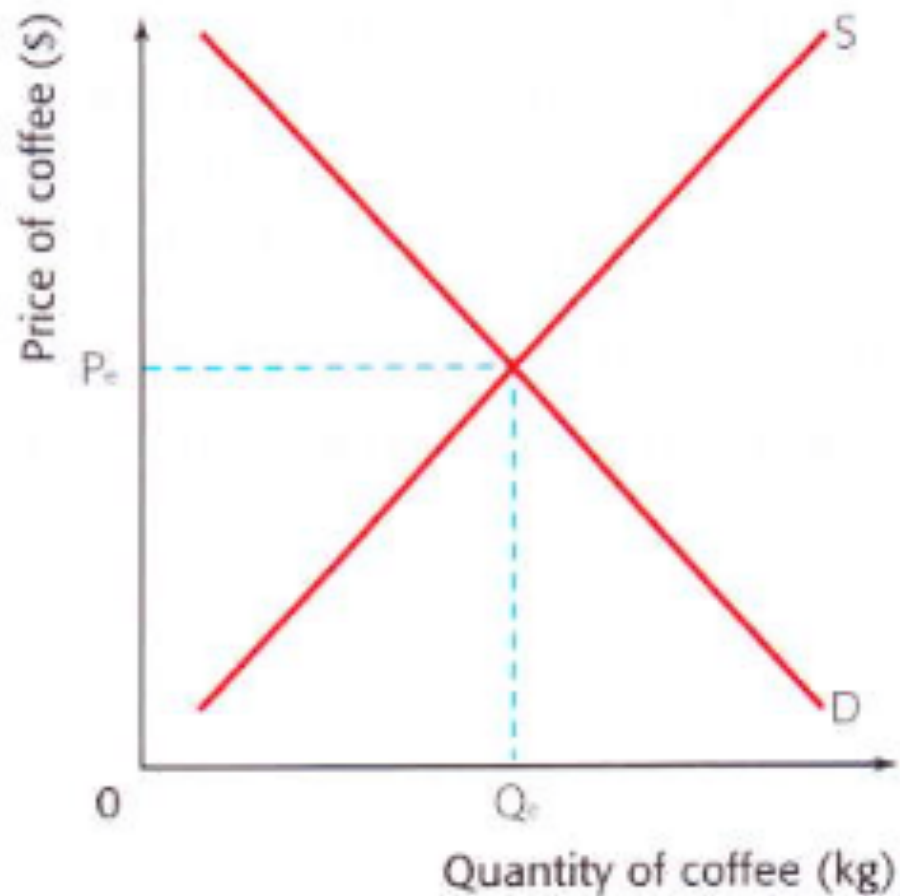


Calculating areas of different shapes

Alejandra, Howard, Katherine, WonGi

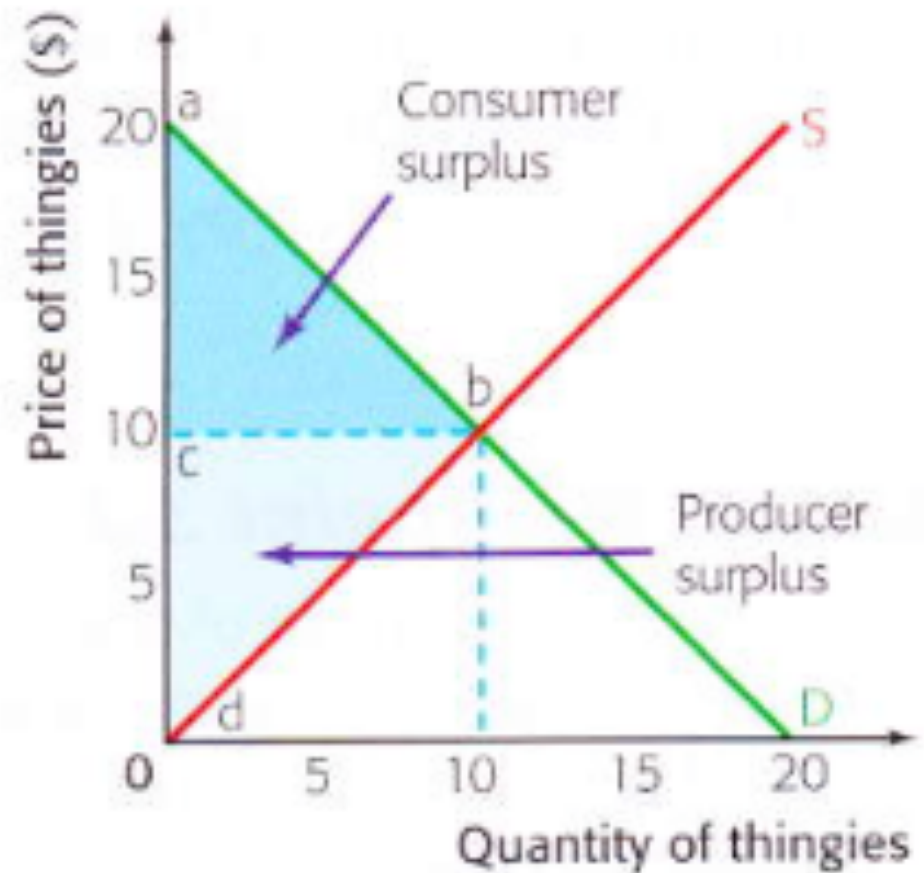
Microeconomics

Demand and Supply



Revenue

$$P_e \times Q_e$$



Consumer Surplus

$$\frac{1}{2}(a - c) \times b$$

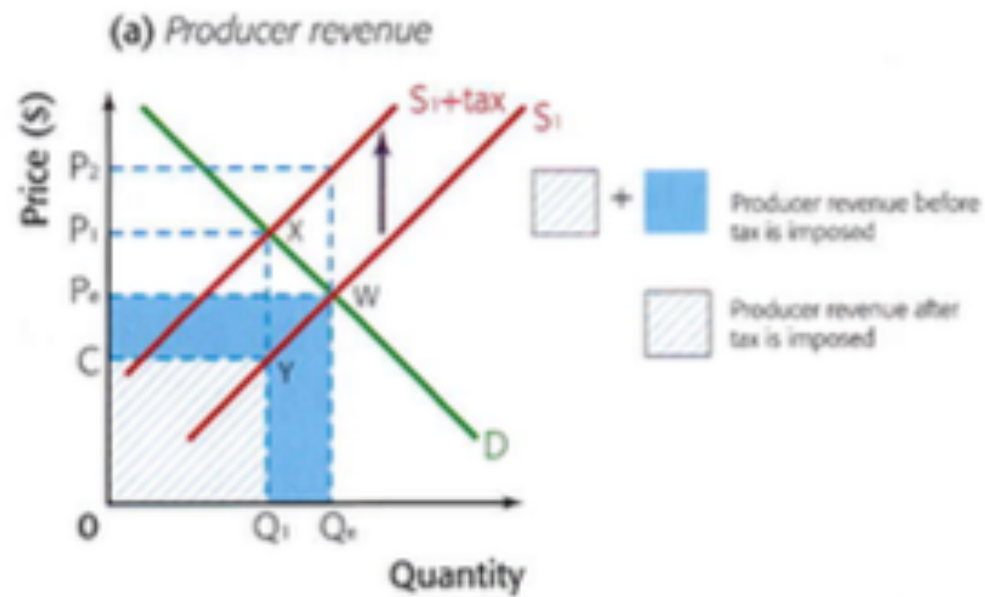
$$\text{ex. } \frac{1}{2}(20 - 10) \times 10 = 50$$

Producer Surplus

$$\frac{1}{2}(c - d) \times b$$

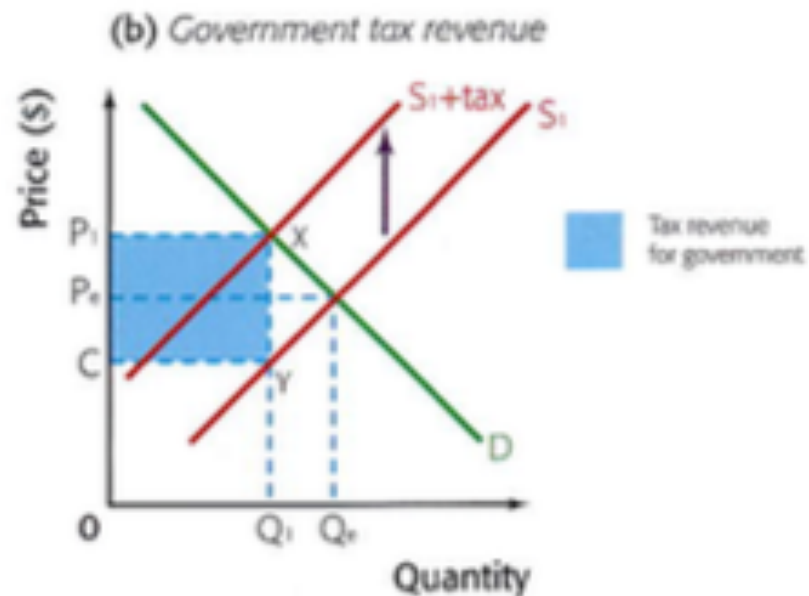
$$\text{ex. } \frac{1}{2}(10 - 0) \times 10 = 50$$

Tax



Producer revenue (before tax)
 $= (P_e - 0) \times (Q_e - 0)$

Producer revenue (after tax)
 $= (C - 0) \times (Q_1 - 0)$

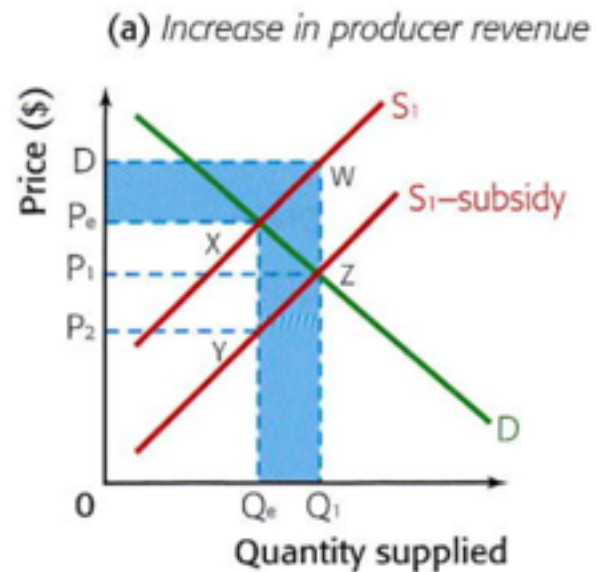


Government revenue from tax
 $= (P_1 - C) \times (Q_1 - 0)$

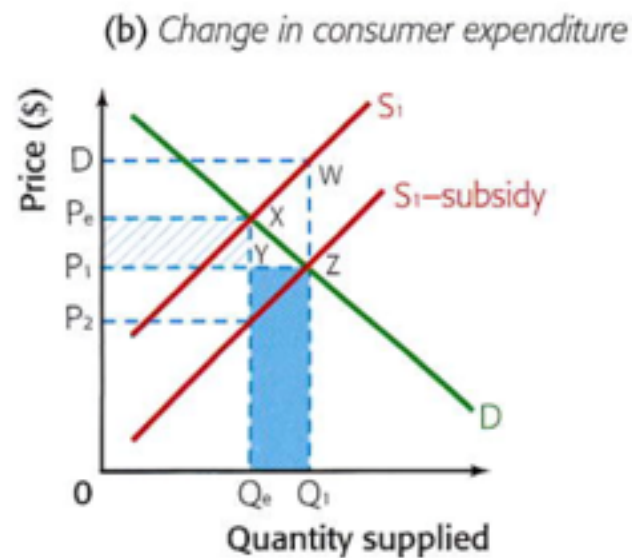


Tax Burden for Consumers
 $= (P_1 - P_e) \times (Q_1 - 0)$
 Tax Burden for Producers
 $= (P_e - C) \times (Q_1 - 0)$

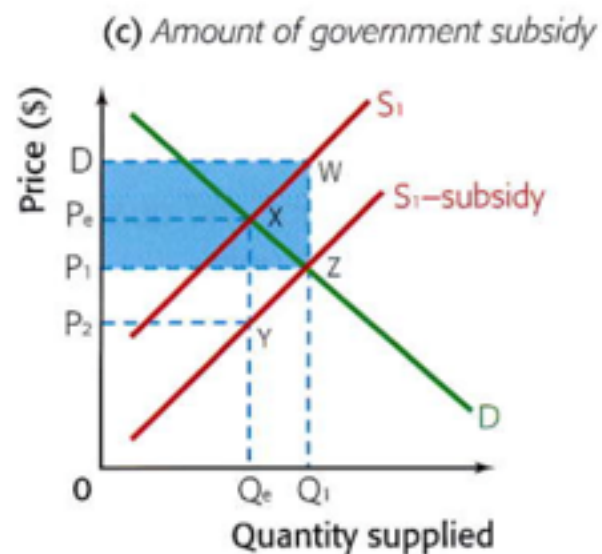
Subsidies



$$\begin{aligned} &\text{Increase in Producer Revenue} \\ &= (D - P_e) \times (Q_e - 0) + D \times (Q_1 - Q_e) \end{aligned}$$

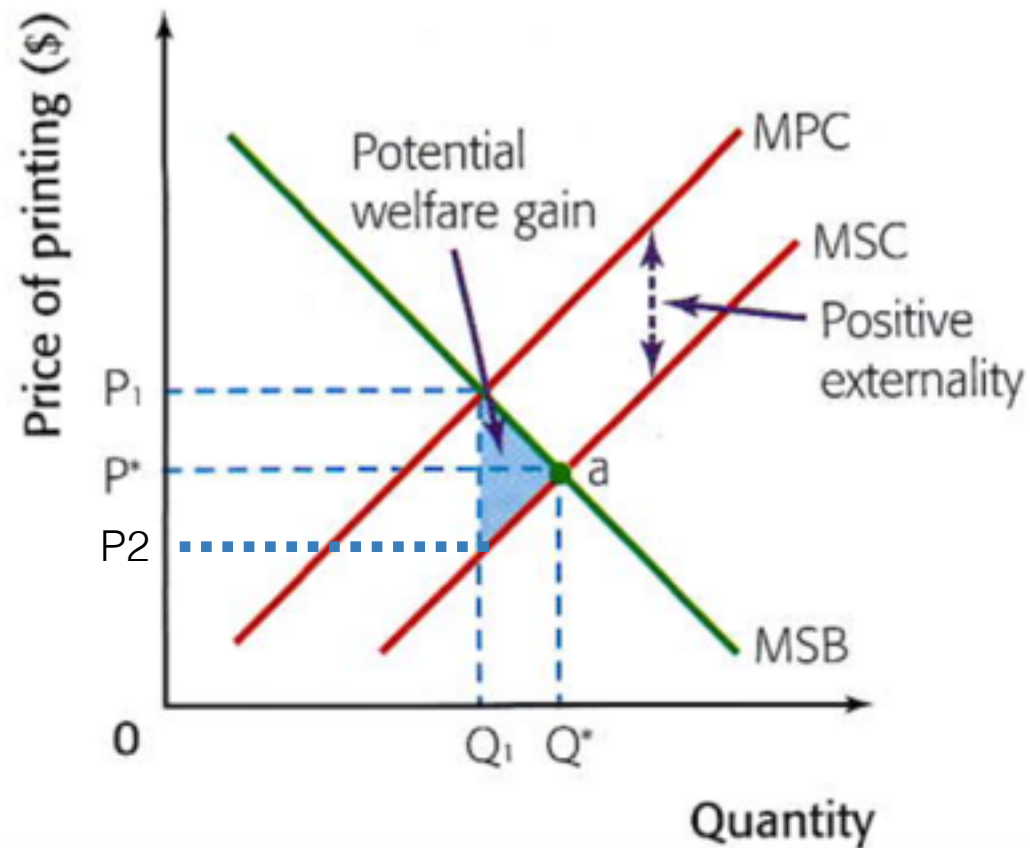


$$\begin{aligned} &\text{Change in Consumer Expenditure} \\ &= (P_1 - 0) \times (Q_1 - Q_e) \end{aligned}$$



$$\begin{aligned} &\text{Amount of government subsidy} \\ &= (D - P_1) \times (Q_1 - 0) \end{aligned}$$

Externalities

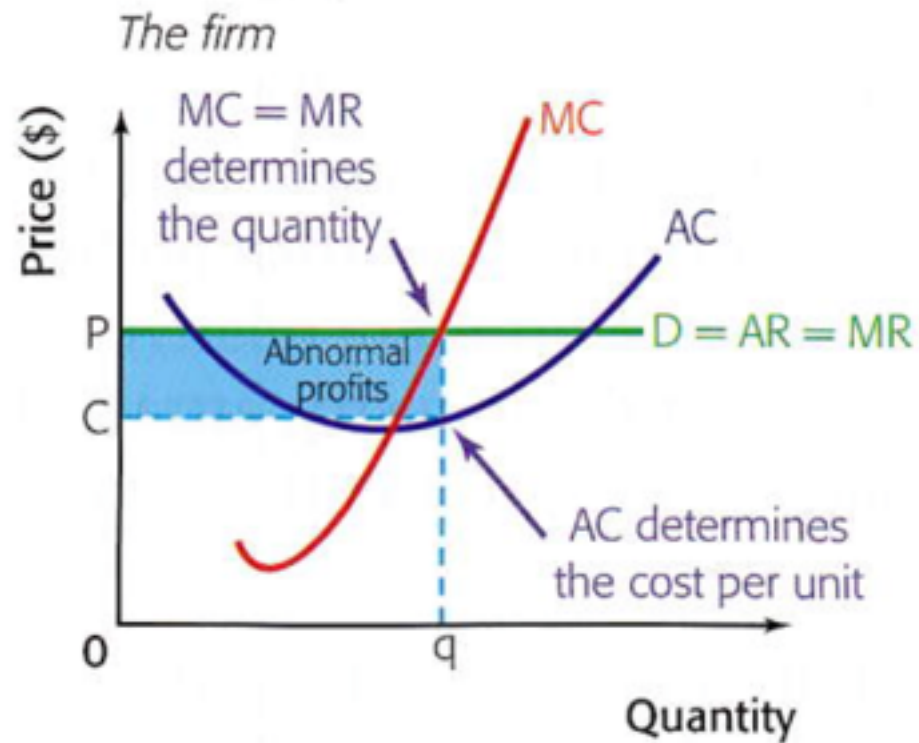


Welfare

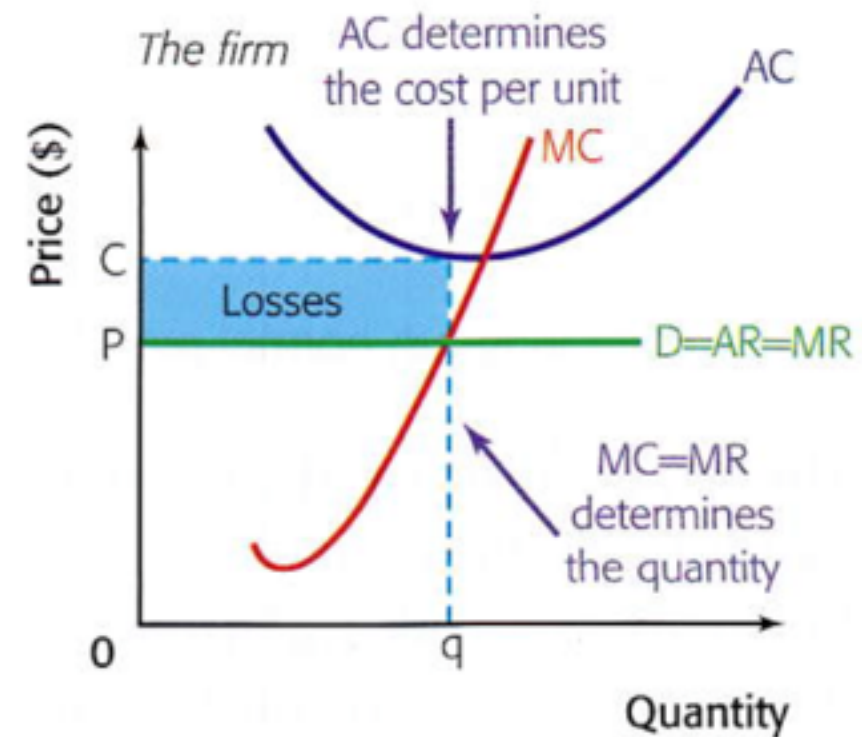
$$= (P1 - P2) \times (Qe - Q1) \times 1/2$$

Theory of the Firm

Abnormal Profits/Losses

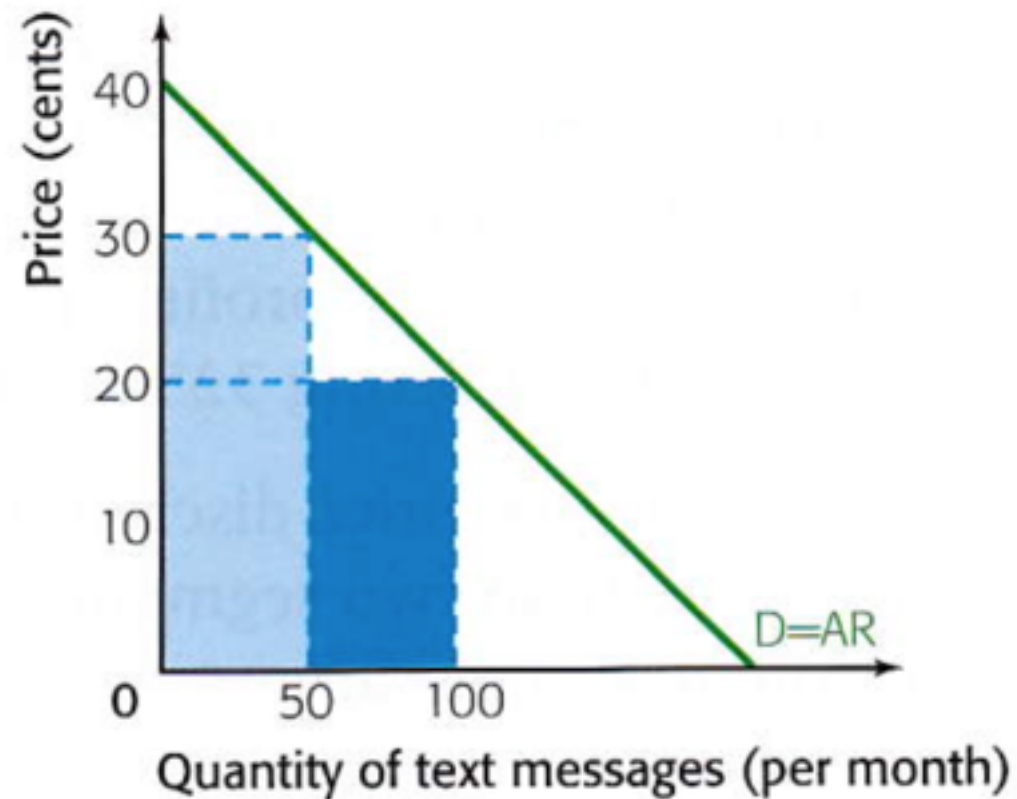


Abnormal Profits
 $(P - C) \times (q - 0)$



Losses
 $(C - P) \times (q - 0)$

Second Degree Price Discrimination



First Bar = $30 \times 50 = 1500$
Second Bar = $20 \times 100 = 2000$
...

Trade

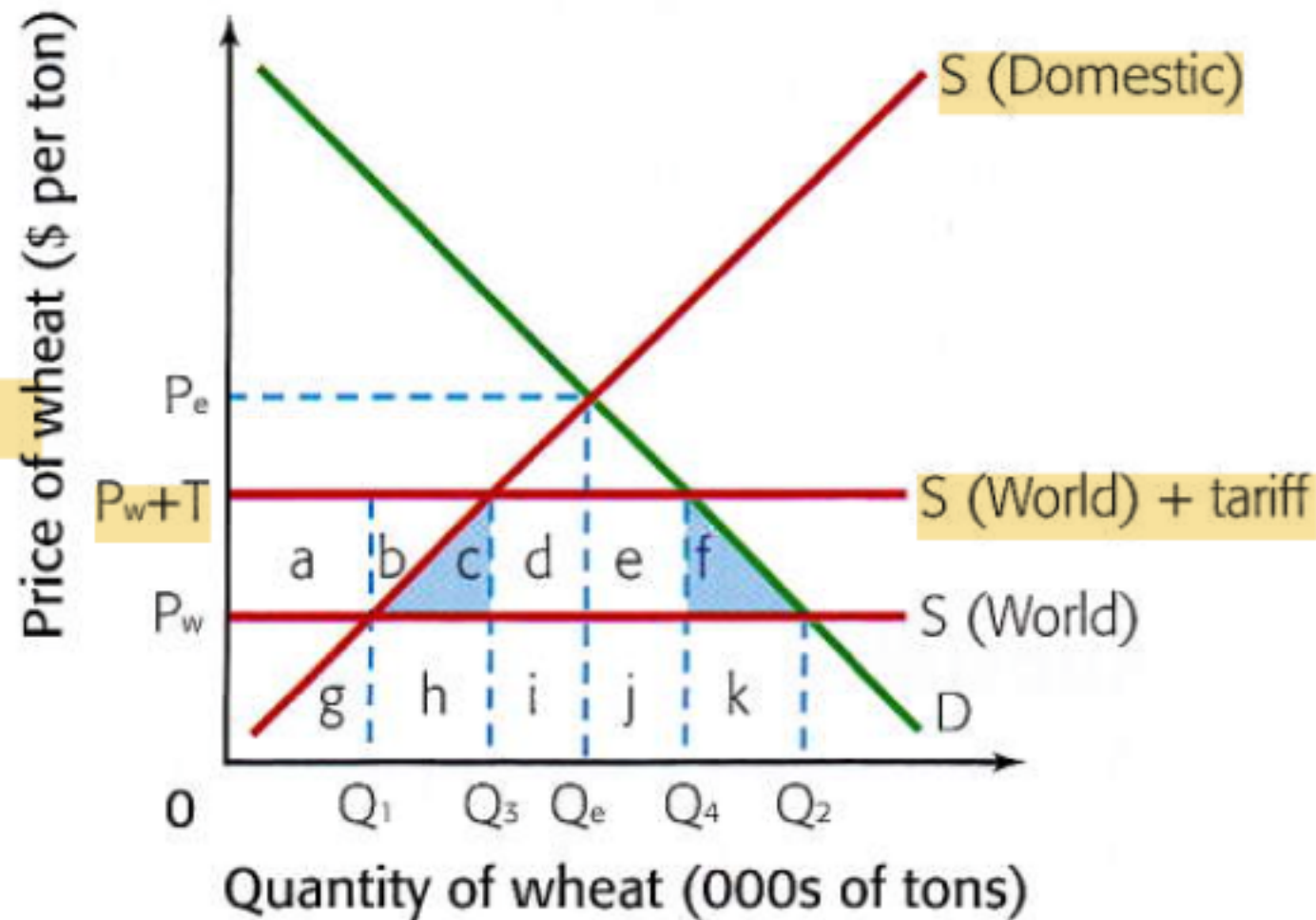


Figure 22.2 A tariff on wheat imports

Dead Weight Loss (Inefficiency)

$$= c$$

$$= (P_w + T - P_w) \times (Q_3 - Q_1) / 2$$

Loss of Consumer Surplus

$$= f$$

$$= (P_w + T - P_w) \times (Q_2 - Q_4) / 2$$

Tax Revenue

$$= e + d$$

$$= (Q_4 - Q_3) \times (P_w + T - P_w)$$

Domestic revenue before trade

$$= P_e \times Q_e$$

Domestic revenue after trade

$$= g$$

$$= P_w \times Q_1$$

Domestic revenue after tariff

$$= a + b + c + g + h$$

$$= (P_w + T) \times Q_3$$

Foreign revenue before tariff

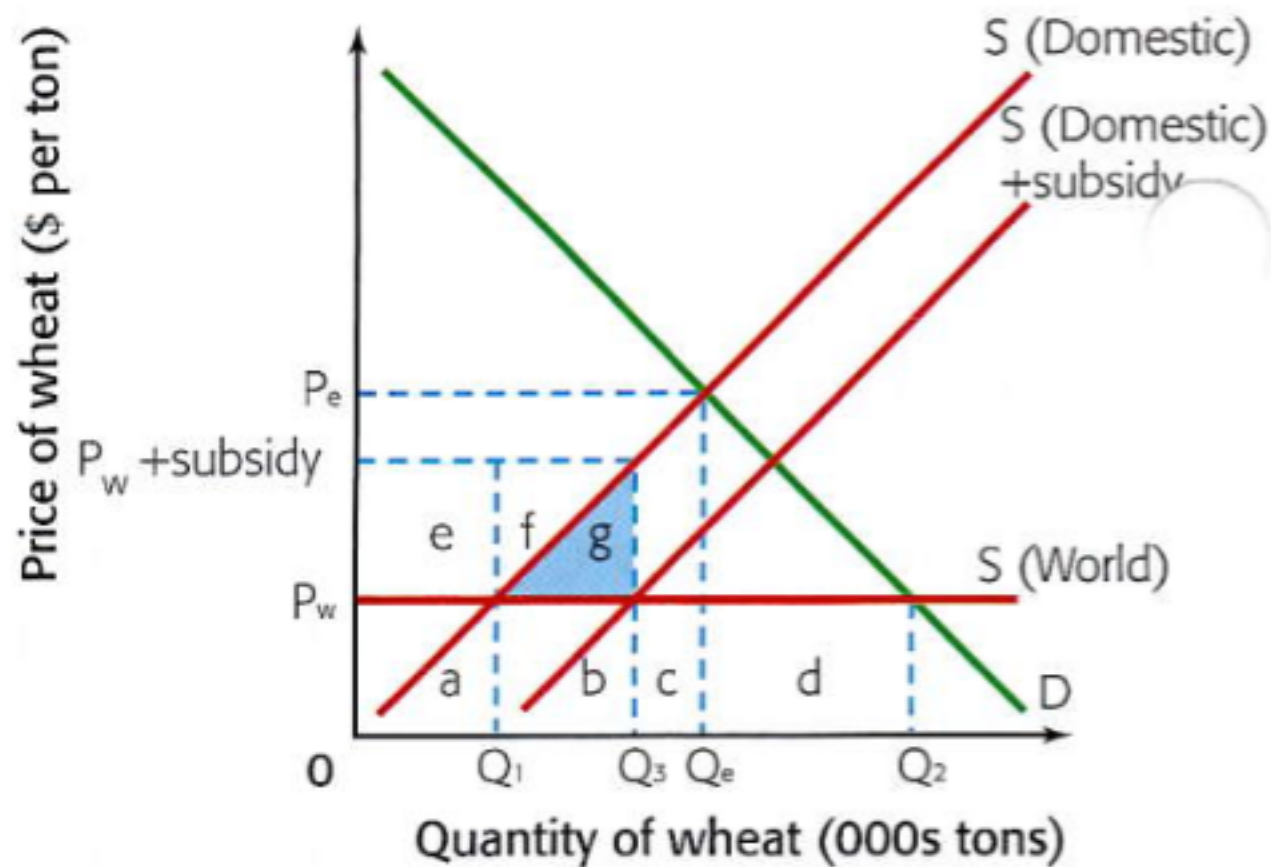
$$= h + i + j + k$$

$$= P_w \times (Q_2 - Q_1)$$

Foreign revenue after tariff

$$= i + j$$

$$= P_w \times (Q_4 - Q_3)$$



$$\begin{aligned} \text{Dead Weight Loss (Inefficiency)} &= g \\ &= (P_w + \text{Subsidy} - P_w) \times (Q_3 - Q_1) / 2 \end{aligned}$$

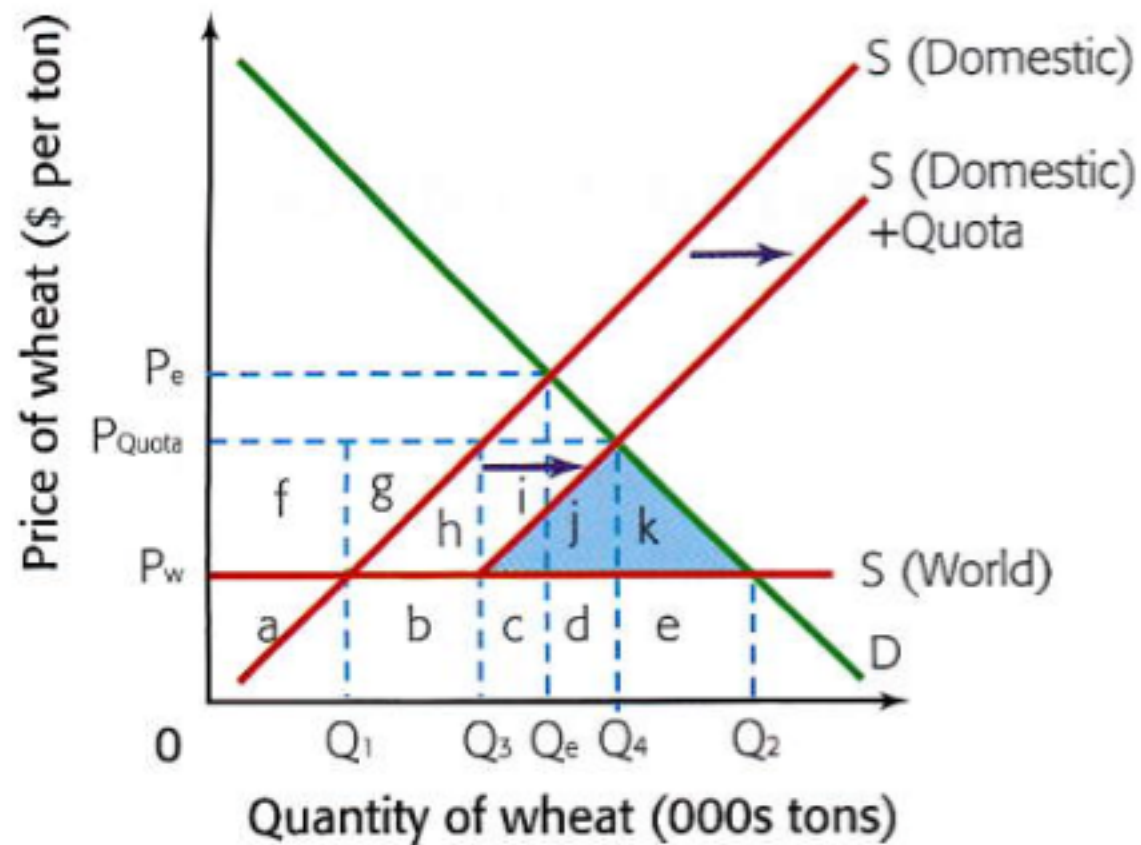
$$\begin{aligned} \text{Domestic revenue before trade} &= P_e \times Q_e \end{aligned}$$

$$\begin{aligned} \text{Domestic revenue after trade} &= a \\ &= P_w \times Q_1 \end{aligned}$$

$$\begin{aligned} \text{Domestic revenue after subsidy} &= a + e + f + g + b \\ &= P_w \times Q_3 \end{aligned}$$

$$\begin{aligned} \text{Foreign revenue before subsidy} &= b + c + d \\ &= P_w \times (Q_2 - Q_1) \end{aligned}$$

$$\begin{aligned} \text{Foreign revenue after subsidy} &= c + d \\ &= P_w \times (Q_2 - Q_3) \end{aligned}$$



Domestic revenue before trade
 $= P_e \times Q_e$

Domestic revenue after trade
 $= a$
 $= P_w \times Q_1$

Domestic revenue after Quota
 $= a + c + d + f + i + j$
 $= P_{Quota} \times Q_1 + P_{Quota} \times (Q_4 - Q_3)$

Dead Weight Loss (Inefficiency)
 $= j$
 $= (P_{Quota} - P_w) \times (Q_4 - Q_3) / 2$

Loss of Consumer Surplus
 $= k$
 $= (P_{Quota} - P_w) \times (Q_2 - Q_4) / 2$

Foreign revenue before Quota
 $= b + c + d + e$
 $= P_w \times (Q_2 - Q_1)$

Foreign revenue after Quota
 $= g + h + b$
 $= P_{Quota} \times (Q_3 - Q_1)$

Domestic producer's minimum revenue
 $= c + d + j$
 $= (P_w + P_{Quota}) \times (Q_4 - Q_3) \times 1/2$